FIG. 1

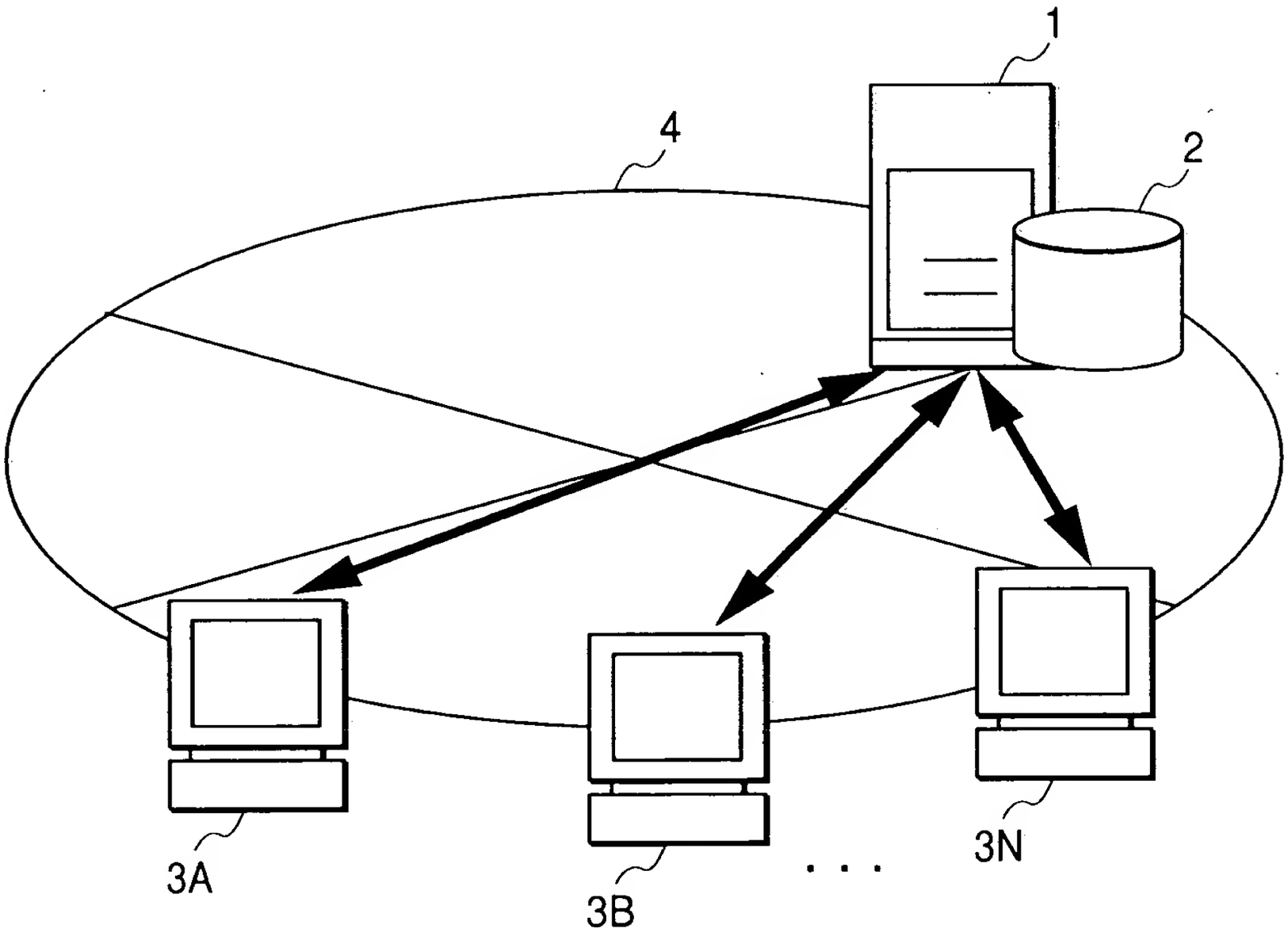
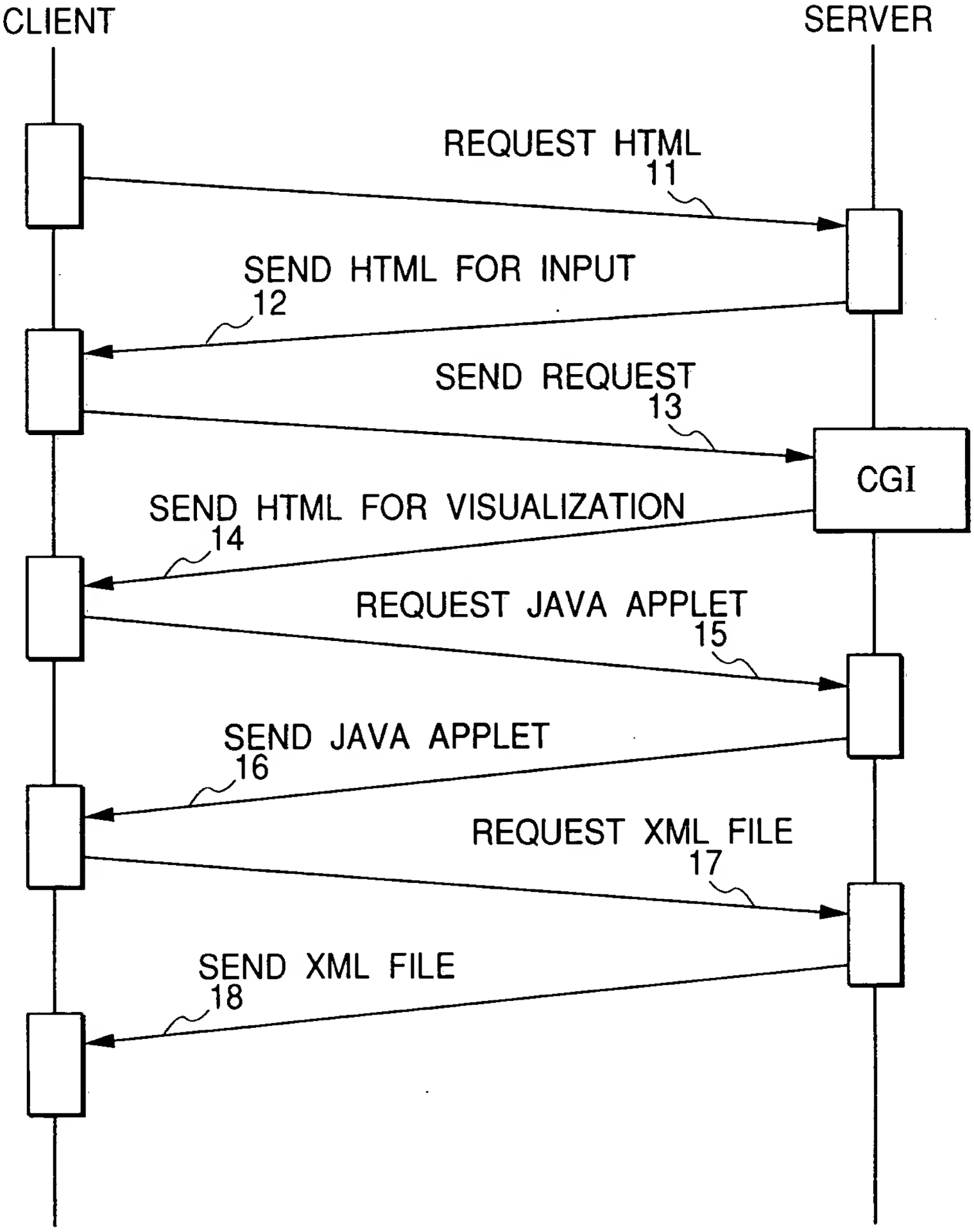


FIG. 2


CLIENT
SERVER
REQUEST HTML
11
SEND HTML FOR INPUT
12
SEND REQUEST
13
CGI
SEND HTML FOR VISUALIZATION
14
REQUEST JAVA APPLET
15
SEND JAVA APPLET
16
REQUEST XML FILE
17
SEND XML FILE
18

EP 2 360 880 A1 20110824

FIG. 3

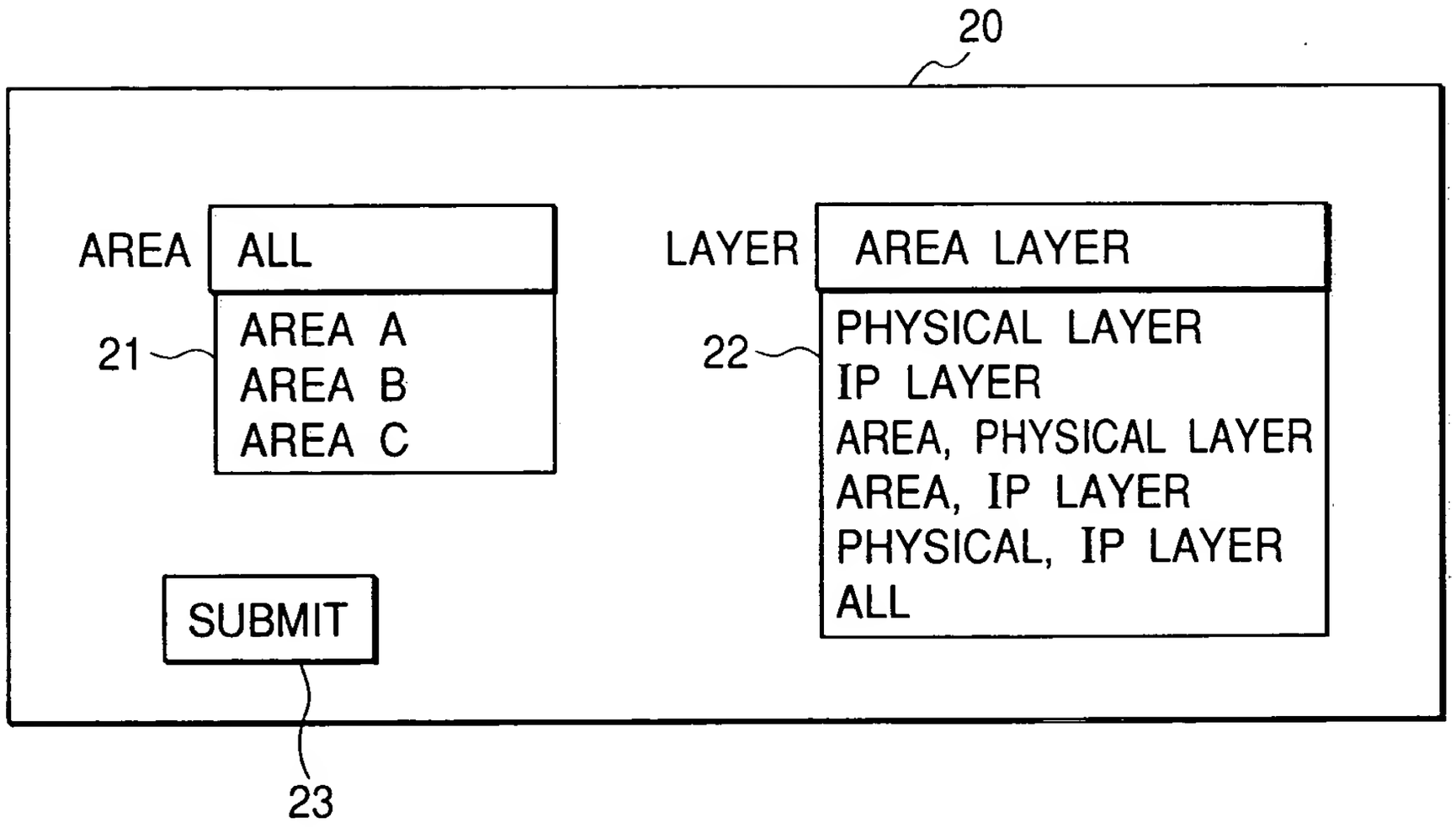


FIG. 4

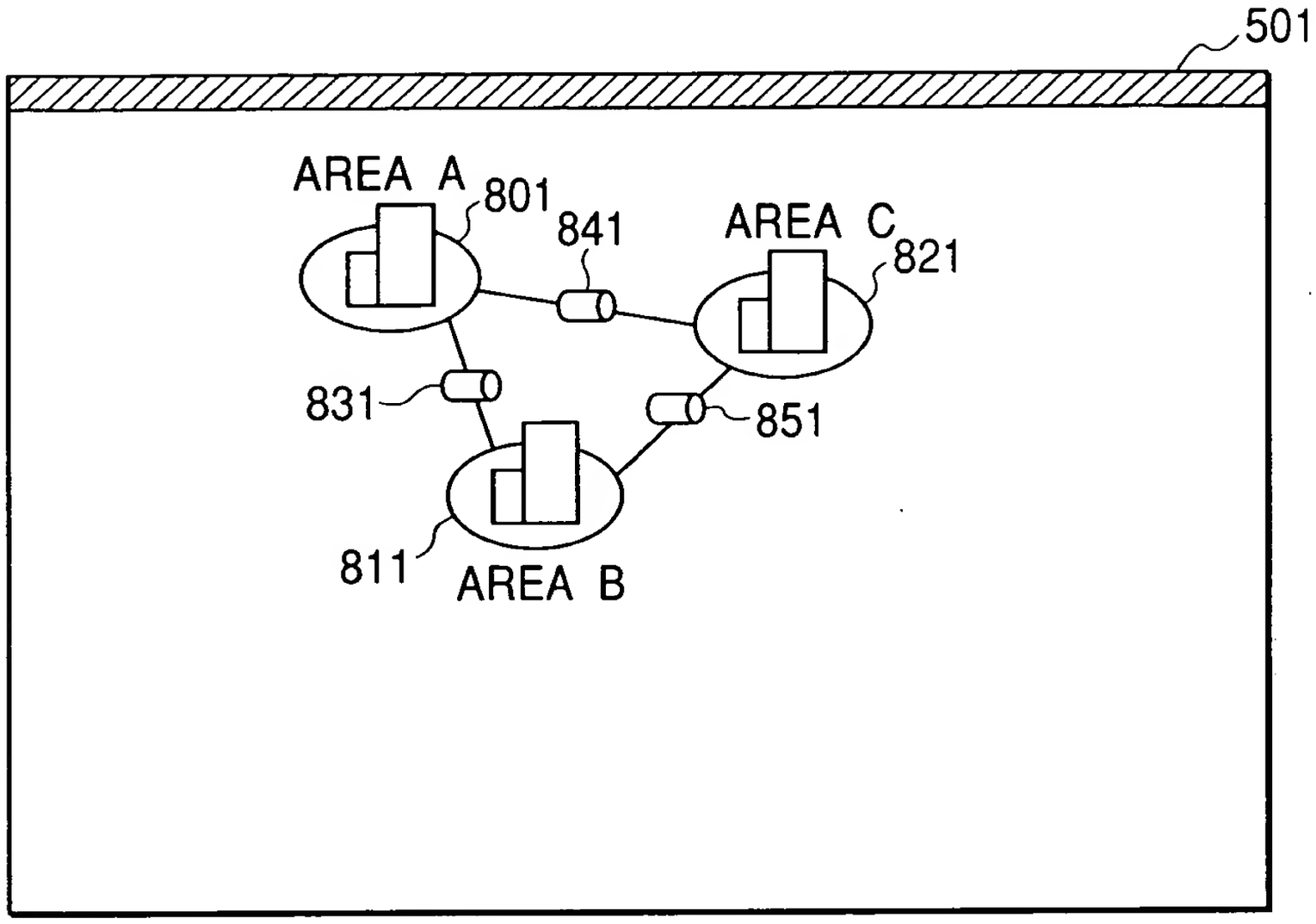

501
AREA A
801
841
AREA C
821
831
851
811
AREA B

FIG. 5

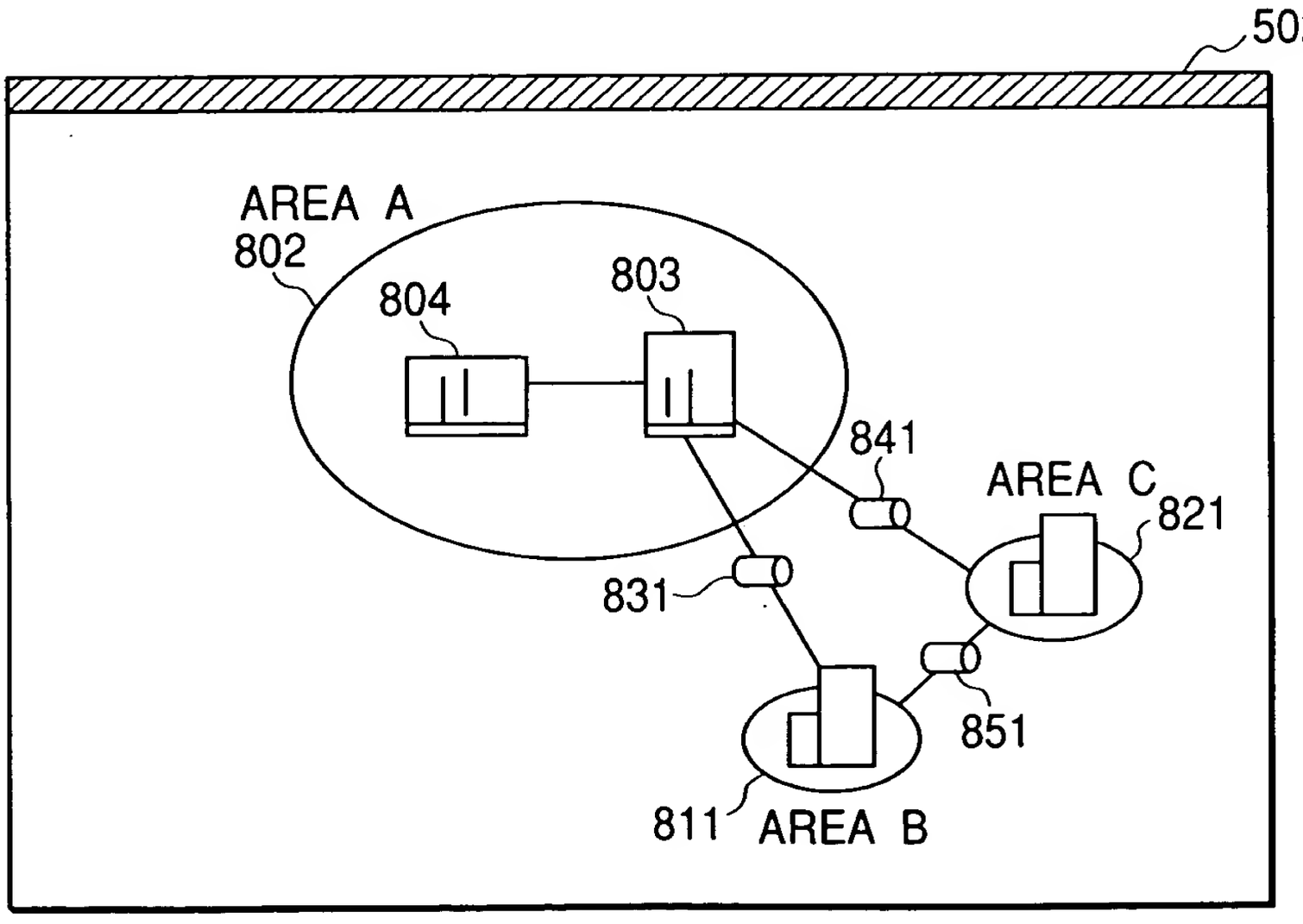

502
AREA A
802
804
803
841
AREA C
821
831
851
811
AREA B

FIG. 6

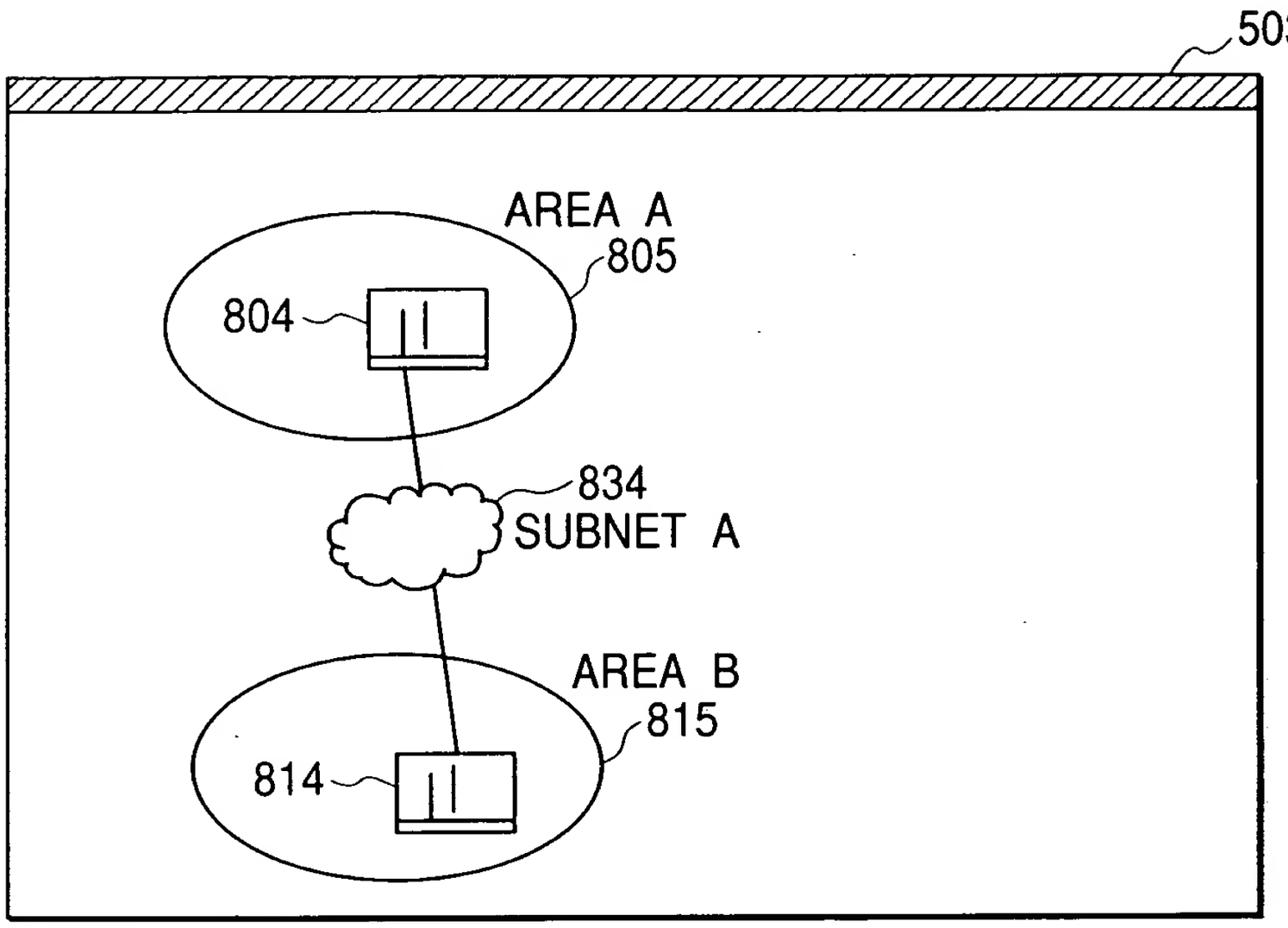

503
AREA A
805
804
834
SUBNET A
AREA B
815
814

FIG. 7

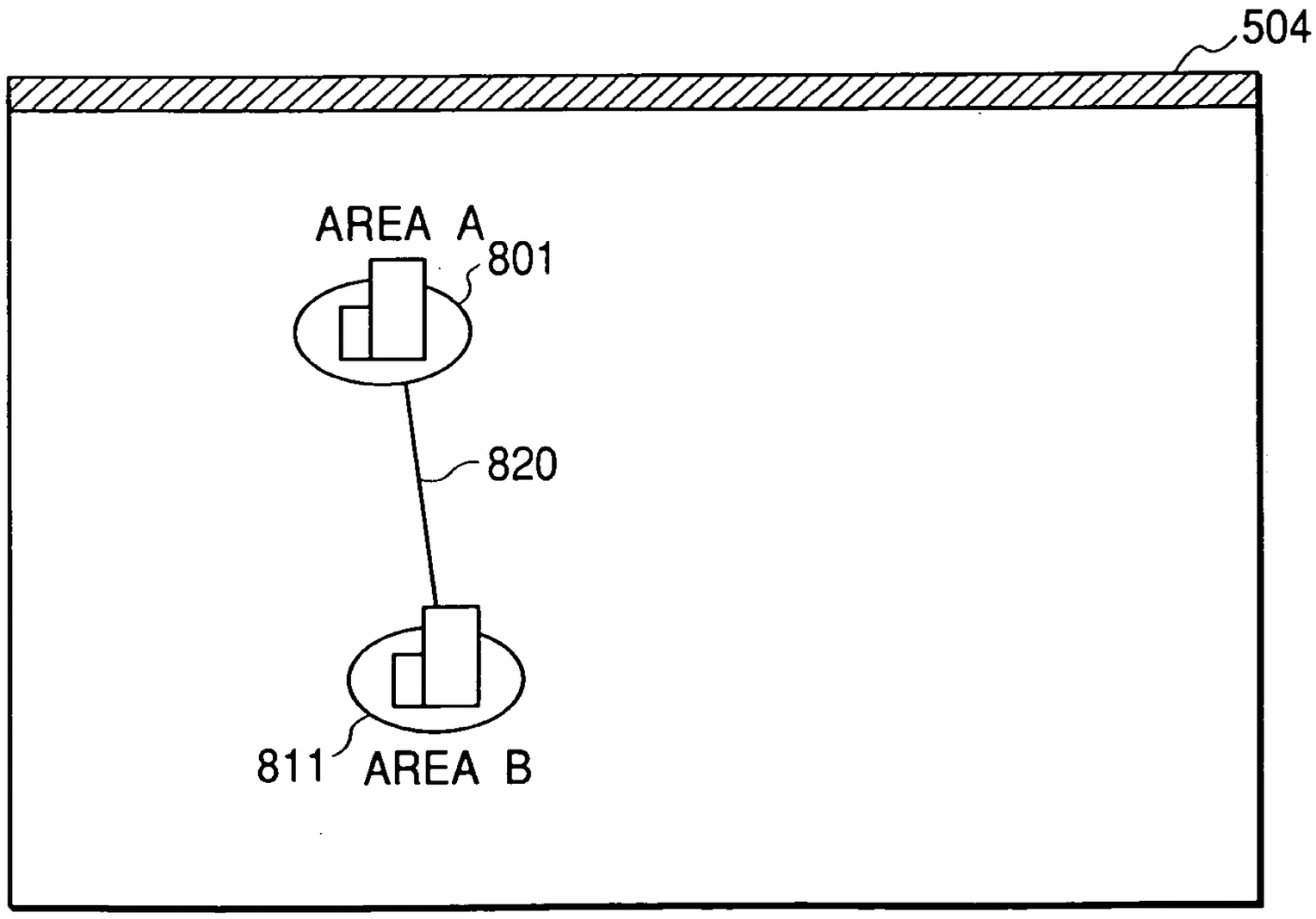

504
AREA A
801
820
811
AREA B

FIG. 8

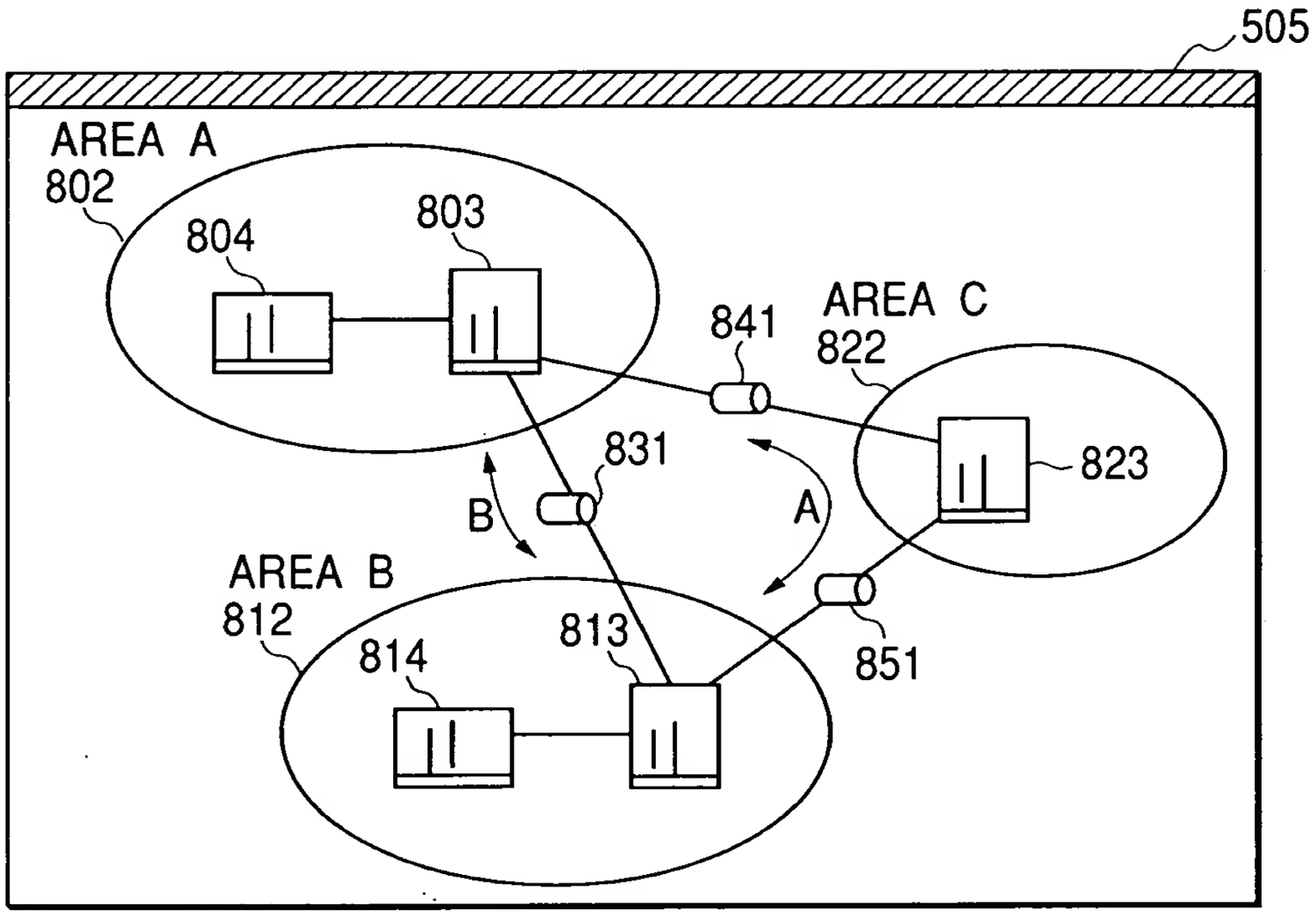

505
AREA A
802
804
803
841
AREA C
822
823
831
B
A
AREA B
812
814
813
851

FIG. 9

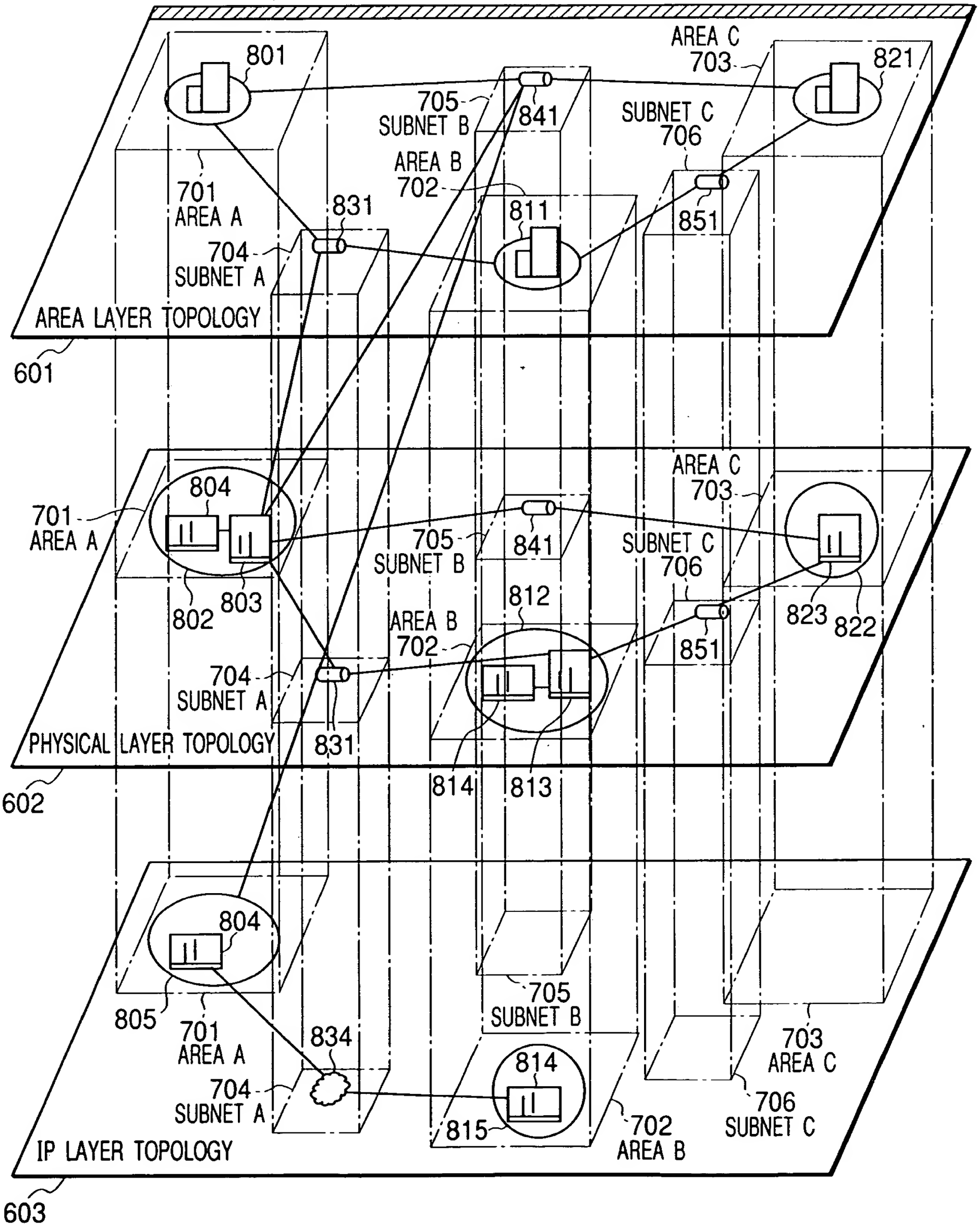

801
701
AREA A
704
SUBNET A
831
705
SUBNET B
841
AREA B
702
811
AREA C
703
821
SUBNET C
706
851
AREA LAYER TOPOLOGY
601
804
802
803
812
823
822
814
813
PHYSICAL LAYER TOPOLOGY
602
805
834
815
IP LAYER TOPOLOGY
603

FIG. 10

210-1

```
1   〈equip name="router804"〉
2     〈position x="20" y="50" w="40" h="20"/〉
3     〈icon url="http://foo/router.gif"/〉
4   〈/equip〉
5   〈equip name="atm-sw803"〉
6     〈position x="30" y="10" w="20" h="30"/〉
7     〈icon url="http://foo/atm-sw.gif"/〉
8   〈/equip〉
9   〈equip name="router814"〉
10    〈position x="20" y="50" w="40" h="20"/〉
11    〈icon url="http://foo/router.gif"/〉
12  〈/equip〉
13  〈equip name="atm-sw813"〉
14    〈position x="30" y="10" w="20" h="30"/〉
15    〈icon url="http://foo/atm-sw.gif"/〉
16  〈/equip〉
17  〈equip name="atm-sw823"〉
18    〈position x="30" y="10" w="20" h="30"/〉
19    〈icon url="http://foo/atm-sw.gif"/〉
20  〈/equip〉
21  〈location name="A-relay801"〉
22    〈position x="5" y="5" w="20" h="20"/〉
23    〈icon url="http://foo/relay.gif"/〉
24  〈/location〉
25    〈location name="A-relay802"〉
26    〈position x="0" y="0" w="100" h="100"/〉
27    〈icon url="http://foo/relay.2.gif"/〉
28  〈/location〉
29  〈location name="A-relay805"〉
30    〈position x="0" y="0" w="60" h="50"/〉
31    〈icon url="http://foo/relay.3.gif"/〉
32  〈/location〉
```

FIG. 11

210-2

```
33    〈location name="B-relay811"〉
34      〈position x="0" y="0" w="20" h="20"/〉
35      〈icon url="http://foo/relay.gif"/〉
36    〈/location〉
37    〈location name="B-relay812"〉
38      〈position x="0" y="0" w="100" h="100"/〉
39      〈icon url="http://foo/relay.2.gif"/〉
40    〈/location〉
41    〈location name="B-relay815"〉
42      〈position x="0" y="0" w="100" h="100"/〉
43      〈icon url="http://foo/relay.3.gif"/〉
44    〈/location〉
45    〈location name="C-relay821"〉
46      〈position x="0" y="0" w="20" h="20"/〉
47      〈icon url="http://foo/relay.gif"/〉
48    〈/location〉
49    〈location name="C-relay822"〉
50      〈position x="0" y="0" w="30" h="30"/〉
51      〈icon url="http://foo/relay.4.gif"/〉
52    〈/location〉
53    〈net name="netA831"〉
54      〈position x="0" y="0" w="10" h="10"/〉
55      〈icon type="http://foo/physicalNet.gif"/〉
56    〈/net〉
57    〈net name="netA834"〉
58      〈position x="0" y="0" w="10" h="10"/〉
59      〈icon type="http://foo/logicalNet.gif"/〉
60    〈/net〉
61    〈net name="netB841"〉
62      〈position x="0" y="0" w="10" h="10"/〉
63      〈icon type="http://foo/physicalNet.gif"/〉
64    〈/net〉
65    〈net name="netC851"〉
66      〈position x="0" y="0" w="10" h="10"/〉
67      〈icon type="http://foo/physicalNet.gif"/〉
68    〈/net〉
```

US 6,640,248 B1 Oct. 28, 2003

FIG. 12

220-1

```
1   〈LOVD name="A-relay-LOVD" x="10" y="10"〉
2     〈level num="1" w="30" h="30"〉
3       〈obj name="A-relay801"/〉
4     〈/level〉
5     〈level num="2" w="100" h="100"〉
6       〈obj name="A-relay802"/〉
7       〈obj name="router804"/〉
8       〈obj name="atm-sw803"/〉
9     〈/level〉
10    〈level num="3" w="60" h="50"〉
11      〈obj name="A-relay805"/〉
12      〈obj name="router804"/〉
13    〈/level〉
14  〈/LOVD〉
15  〈LOVD name="B-relay-LOVD" x="20" y="70"〉
16    〈level num="1" w="30" h="30"〉
17      〈obj name="B-relay811"/〉
18    〈/level〉
19    〈level num="2" w="100" h="100"〉
20      〈obj name="B-relay812"/〉
21      〈obj name="router814"/〉
22      〈obj name="atm-sw813"/〉
23    〈/level〉
24    〈level num="3" w="60" h="50"〉
25      〈obj name="B-relay815"/〉
26      〈obj name="router814"/〉
27    〈/level〉
28  〈/LOVD〉
29  〈LOVD name="C-relay-LOVD" x="70" y="20"〉
30    〈level num="1" w="30" h="30"〉
31      〈obj name="C-relay821"/〉
32    〈/level〉
33    〈level num="2" w="40" h="50"〉
34      〈obj name="C-relay822"/〉
35      〈obj name="atm-sw823"/〉
36    〈/level〉
37  〈/LOVD〉
```

FIG. 13

220-2

```
38  〈LOVD name="netA-LOVD" x="25" y="50"〉
39    〈level num="1" w="10" h="10"〉
40      〈obj name="netA831"/〉
41    〈/level〉
42    〈level num="2" w="10" h="10"〉
43      〈obj name="netA831"/〉
44    〈/level〉
45    〈level num="3" w="10" h="10"〉
46      〈obj name="netA834"/〉
47    〈/level〉
48  〈/LOVD〉
49  〈LOVD name="netB-LOVD" x="50" y="30"〉
50    〈level num="1" w="10" h="10"〉
51      〈obj name="netB841"/〉
52    〈/level〉
53    〈level num="2" w="10" h="10"〉
54      〈obj name="netB841"/〉
55    〈/level〉
56  〈/LOVD〉
57  〈LOVD name="netC-LOVD" x="60" y="60"〉
58    〈level num="1" w="10" h="10"〉
59      〈obj name="netC851"/〉
60    〈/level〉
61    〈level num="2" w="10" h="10"〉
62      〈obj name="netC851"/〉
63    〈/level〉
64  〈/LOVD〉
65  〈init_LOVD num="1"/〉
```

FIG. 14

```
1   〈connection name="A-relay801"〉
2    〈obj name="netA831"/〉
3   〈/connection〉
4   〈connection name="A-relay801"/〉
5    〈obj name="netB841"/〉
6   〈/connection〉
7   〈connection name="B-relay811"/〉
8    〈obj name="netA831"/〉
9   〈/connection〉
10  〈connection name="B-relay811"〉
11   〈obj name="netC851"/〉
12  〈/connection〉
13  〈connection name="C-relay821"〉
14   〈obj name="netB841"/〉
15  〈/connection〉
16  〈connection name="C-relay821"〉
17   〈obj name="netC851"/〉
18  〈/connection〉
```

230

```
19  〈connection name="atm-sw803"〉
20   〈obj name="netA831"/〉
21  〈/connection〉
22  〈connection name="atm-sw803"〉
23   〈obj name="netB841"/〉
24  〈/connection〉
25  〈connection name="atm-sw813"〉
26   〈obj name="netA831"/〉
27  〈/connection〉
28  〈connection name="atm-sw813"〉
29   〈obj name="netC851"/〉
30  〈/connection〉
31  〈connection name="atm-sw823"〉
32   〈obj name="netB841"/〉
33  〈/connection〉
34  〈connection name="atm-sw823"〉
35   〈obj name="netC851"/〉
36  〈/connection〉
37  〈connection name="router804"〉
38   〈obj name="atm-sw803"/〉
39  〈/connection〉
40  〈connection name="router814"〉
41   〈obj name="atm-sw813"/〉
42  〈/connection〉
43  〈connection name="router804"〉
44   〈obj name="netA834"/〉
45  〈/connection〉
46  〈connection name="router814"〉
47   〈obj name="netA834"/〉
48  〈/connection〉
49  〈connection name="A-relay805"/〉
50   〈obj name="netB841"/〉
51  〈/connection〉
```

US 6,604,136 B1 Aug. 5, 2003

EP 2 040 404 A1 20090325

FIG. 15

240

```
1  〈relation name="netA834"〉
2      〈obj name="atm-sw803"/〉
3      〈obj name="netB841"/〉
4      〈obj name="atm-sw823"/〉
5      〈obj name="netC851"/〉
6      〈obj name="atm-sw813"/〉
7      〈/relation〉
```

FIG. 16

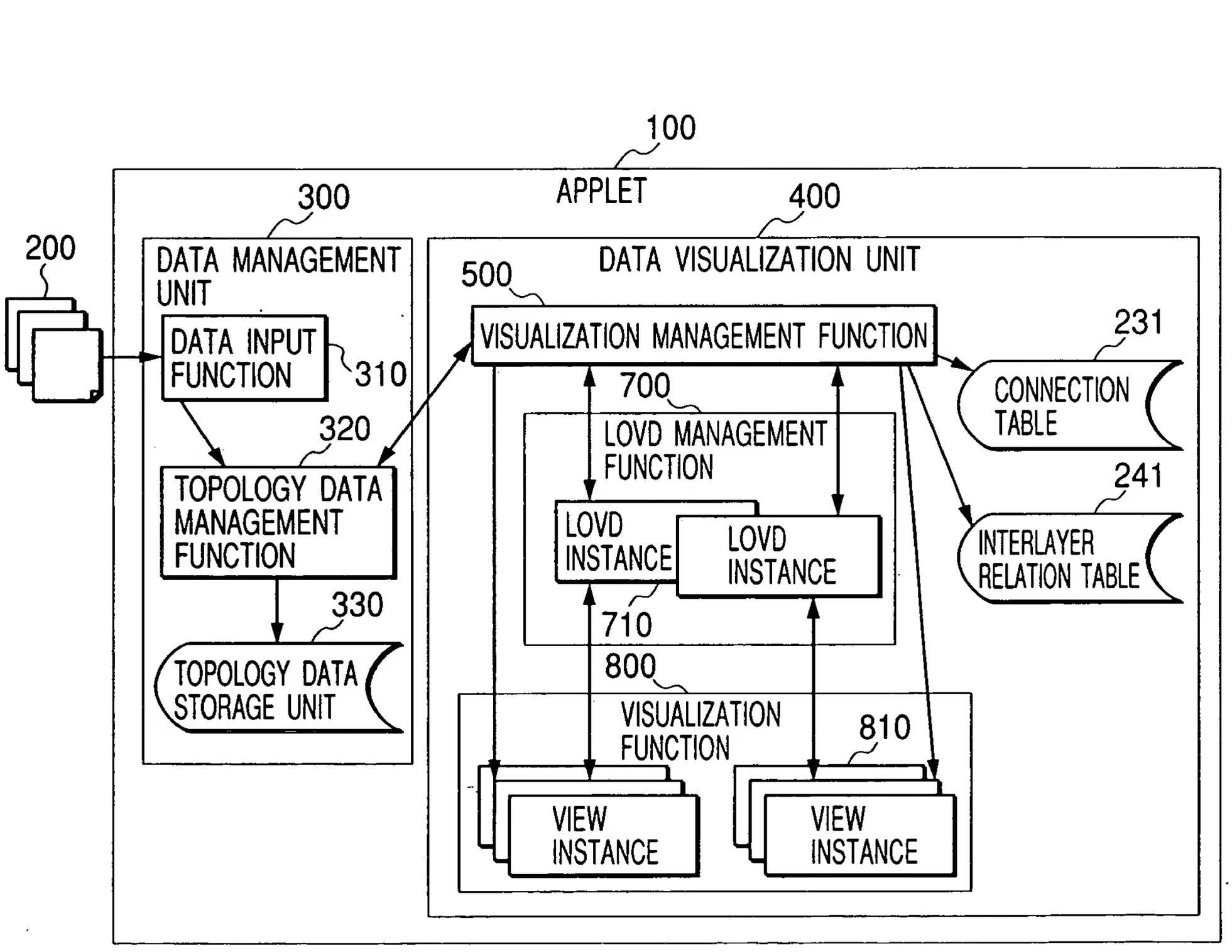

100
APPLET
200
300
DATA MANAGEMENT UNIT
DATA INPUT FUNCTION
310
320
TOPOLOGY DATA MANAGEMENT FUNCTION
330
TOPOLOGY DATA STORAGE UNIT
400
DATA VISUALIZATION UNIT
500
VISUALIZATION MANAGEMENT FUNCTION
231
CONNECTION TABLE
241
INTERLAYER RELATION TABLE
700
LOVD MANAGEMENT FUNCTION
LOVD INSTANCE
LOVD INSTANCE
710
800
VISUALIZATION FUNCTION
810
VIEW INSTANCE
VIEW INSTANCE

FIG. 17

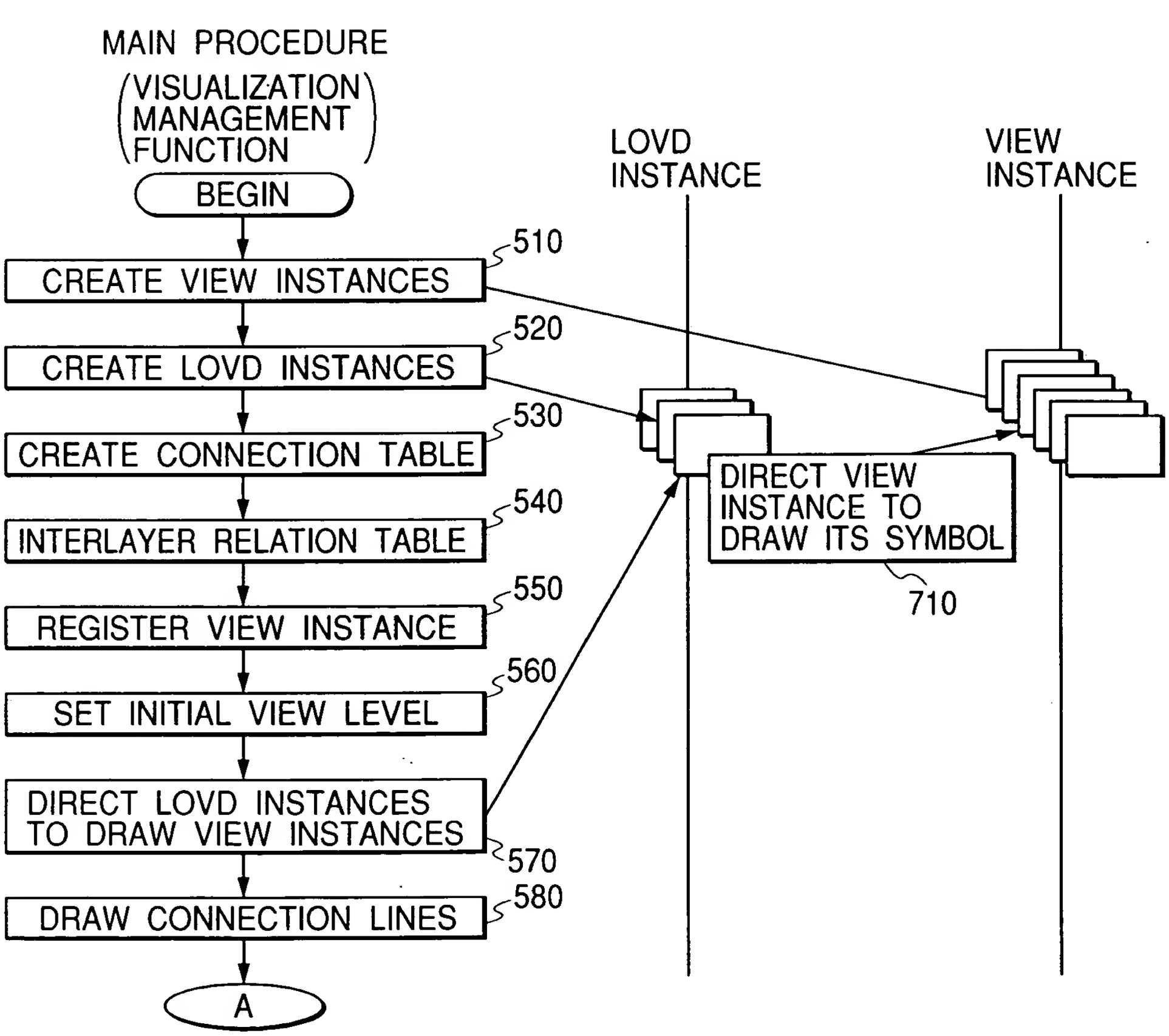

MAIN PROCEDURE
(VISUALIZATION MANAGEMENT FUNCTION)
BEGIN
CREATE VIEW INSTANCES
510
CREATE LOVD INSTANCES
520
CREATE CONNECTION TABLE
530
INTERLAYER RELATION TABLE
540
REGISTER VIEW INSTANCE
550
SET INITIAL VIEW LEVEL
560
DIRECT LOVD INSTANCES TO DRAW VIEW INSTANCES
570
DRAW CONNECTION LINES
580
A
LOVD INSTANCE
VIEW INSTANCE
DIRECT VIEW INSTANCE TO DRAW ITS SYMBOL
710

FIG. 18

231

VIEW INSTANCE	VIEW INSTANCE
A-relay801	netA831
A-relay801	netB841
B-relay811	netA831
B-relay811	netC851
C-relay821	netB841
C-relay821	netC851
atm-sw803	netA831
atm-sw803	netB841
atm-sw813	netA831
atm-sw813	netC851
atm-sw823	netB841
atm-sw823	netC851
router804	atm-sw803
router814	atm-sw813
A-relay805	netB841
router804	netA834
router814	netA834

FIG. 19

241

PARENT INSTANCE	CHILD INSTANCE
netA834	atm-sw803
netA834	netB841
netA834	atm-sw823
netA834	netC851
netA834	atm-sw813

FIG. 20

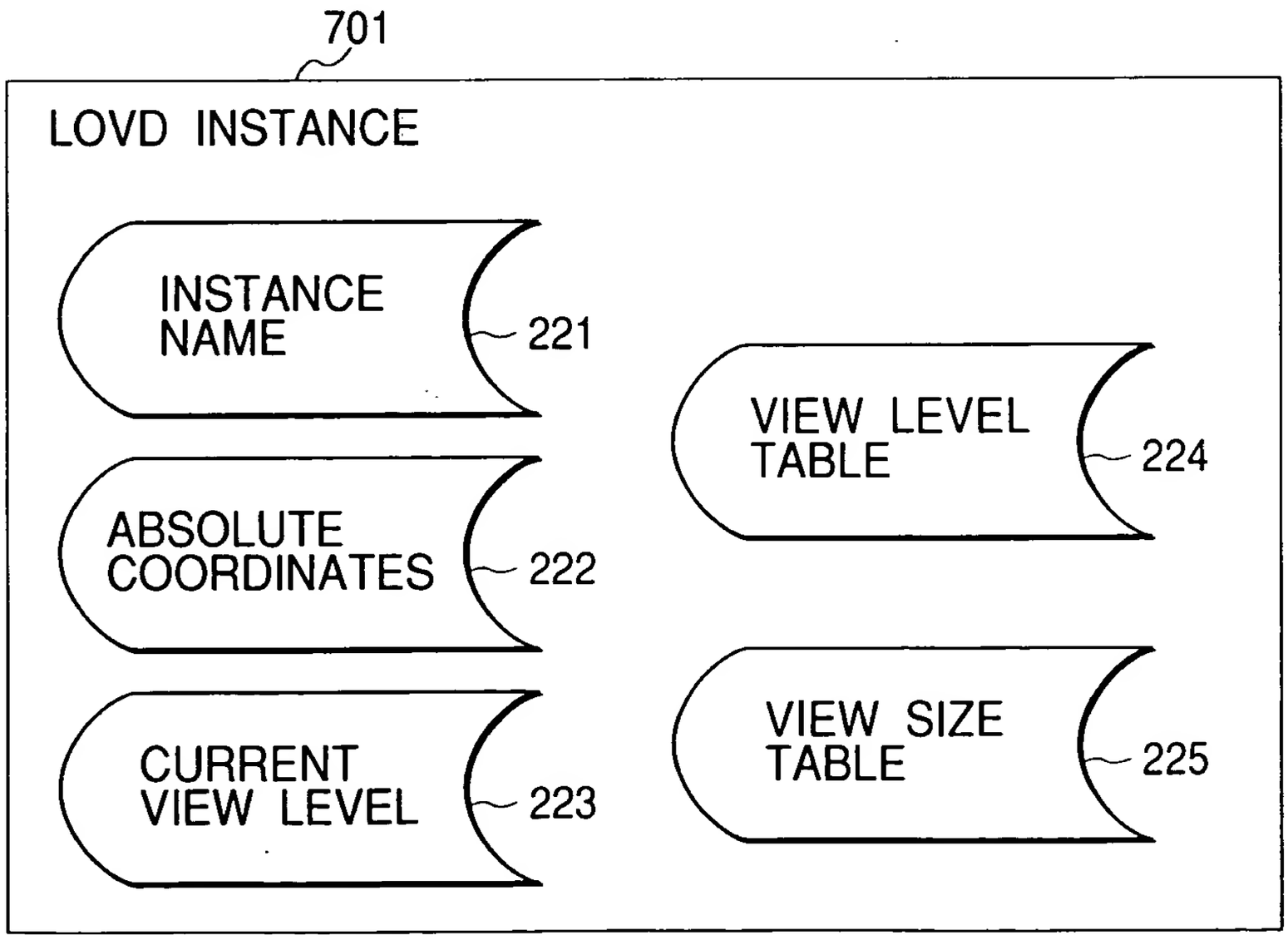


FIG. 21

224

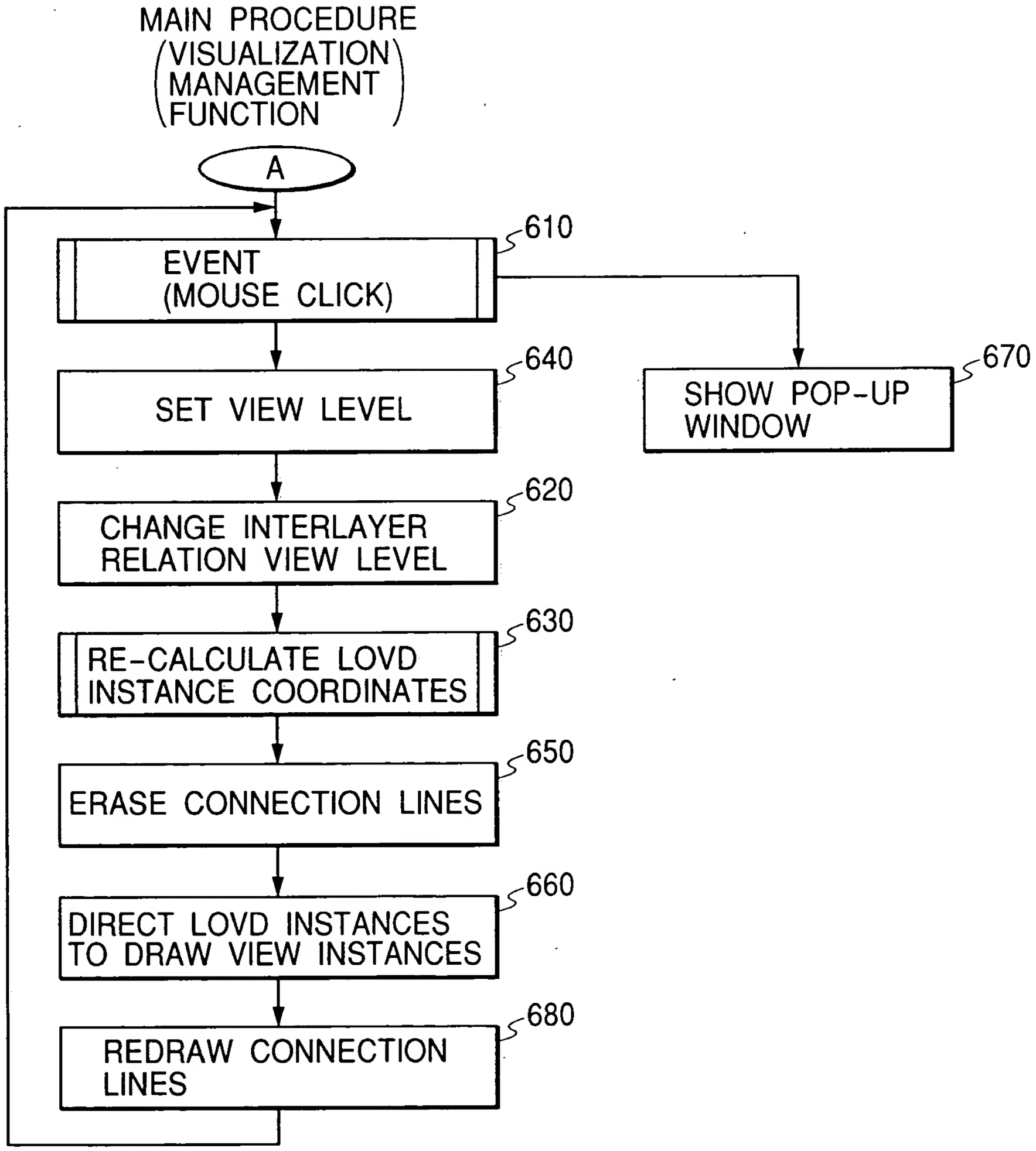
VIEW LEVEL	VIEW INSTANCE
1	A-relay801
2	A-relay802
2	router804
2	atm-sw803
3	A-relay805
3	router804

FIG. 22

225

VIEW LEVEL	WIDTH	HEIGHT
1	30	30
2	100	100
3	60	50

FIG. 23


MAIN PROCEDURE
(VISUALIZATION MANAGEMENT FUNCTION)
A
EVENT (MOUSE CLICK)
610
SET VIEW LEVEL
640
SHOW POP-UP WINDOW
670
CHANGE INTERLAYER RELATION VIEW LEVEL
620
RE-CALCULATE LOVD INSTANCE COORDINATES
630
ERASE CONNECTION LINES
650
DIRECT LOVD INSTANCES TO DRAW VIEW INSTANCES
660
REDRAW CONNECTION LINES
680

EP 0 920 154 A2

FIG. 24

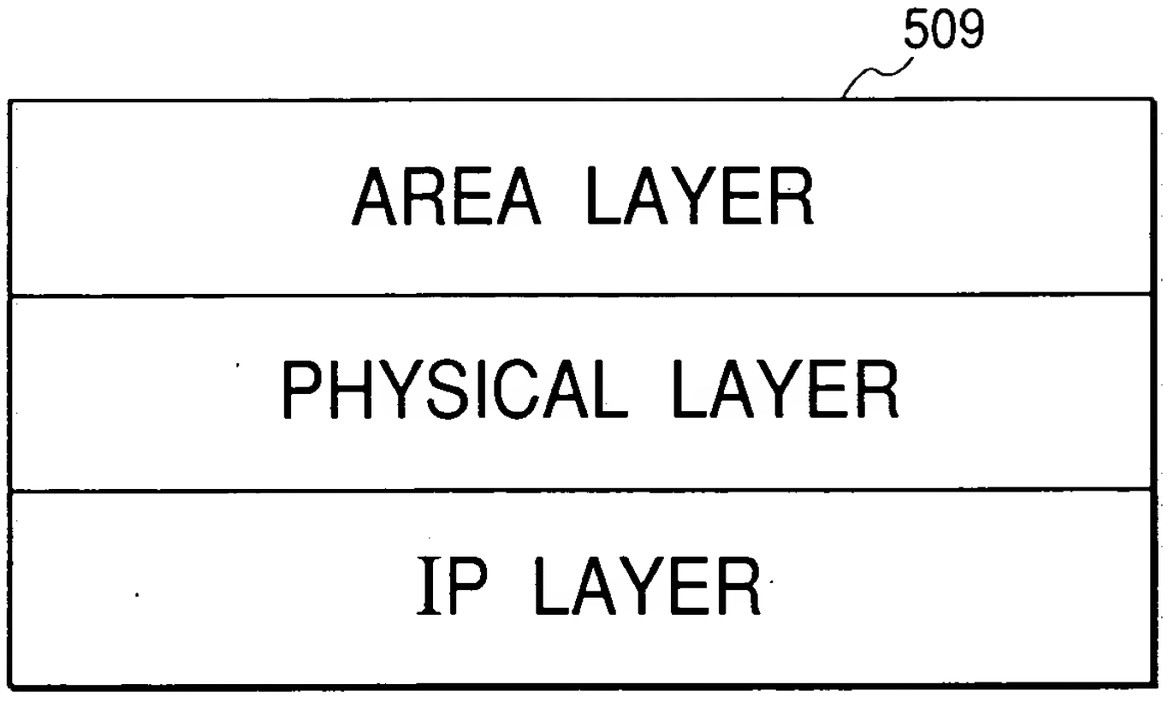


FIG. 25

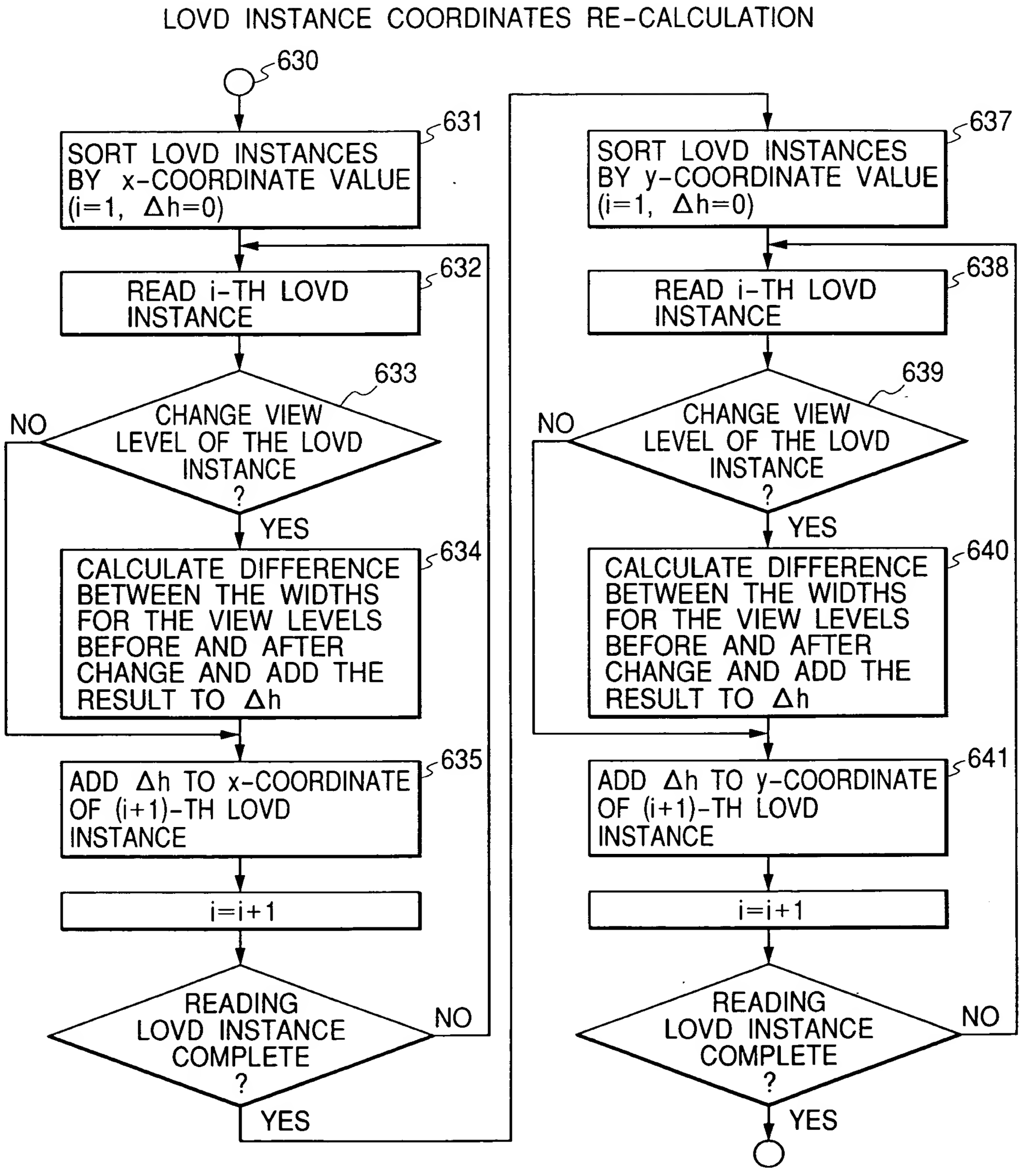

LOVD INSTANCE COORDINATES RE-CALCULATION
630
631
SORT LOVD INSTANCES BY x-COORDINATE VALUE (i=1, Δh=0)
632
READ i-TH LOVD INSTANCE
633
CHANGE VIEW LEVEL OF THE LOVD INSTANCE ?
NO
YES
634
CALCULATE DIFFERENCE BETWEEN THE WIDTHS FOR THE VIEW LEVELS BEFORE AND AFTER CHANGE AND ADD THE RESULT TO Δh
635
ADD Δh TO x-COORDINATE OF (i+1)-TH LOVD INSTANCE
i=i+1
READING LOVD INSTANCE COMPLETE ?
NO
YES
637
SORT LOVD INSTANCES BY y-COORDINATE VALUE (i=1, Δh=0)
638
READ i-TH LOVD INSTANCE
639
CHANGE VIEW LEVEL OF THE LOVD INSTANCE ?
NO
YES
640
CALCULATE DIFFERENCE BETWEEN THE WIDTHS FOR THE VIEW LEVELS BEFORE AND AFTER CHANGE AND ADD THE RESULT TO Δh
641
ADD Δh TO y-COORDINATE OF (i+1)-TH LOVD INSTANCE
i=i+1
READING LOVD INSTANCE COMPLETE ?
NO
YES

FIG. 26

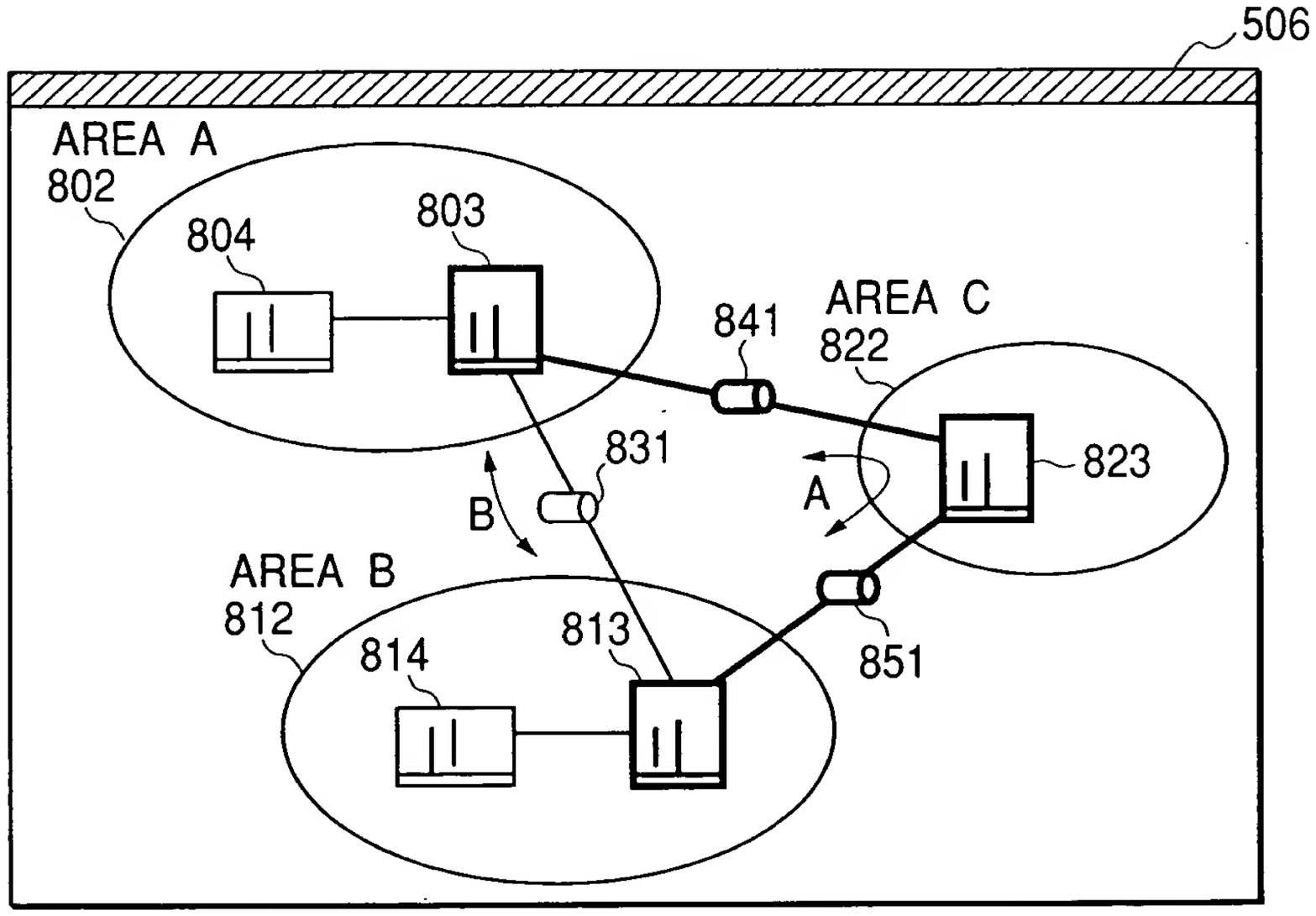

506
AREA A
802
804
803
841
AREA C
822
823
831
B
A
AREA B
812
814
813
851

FIG. 27

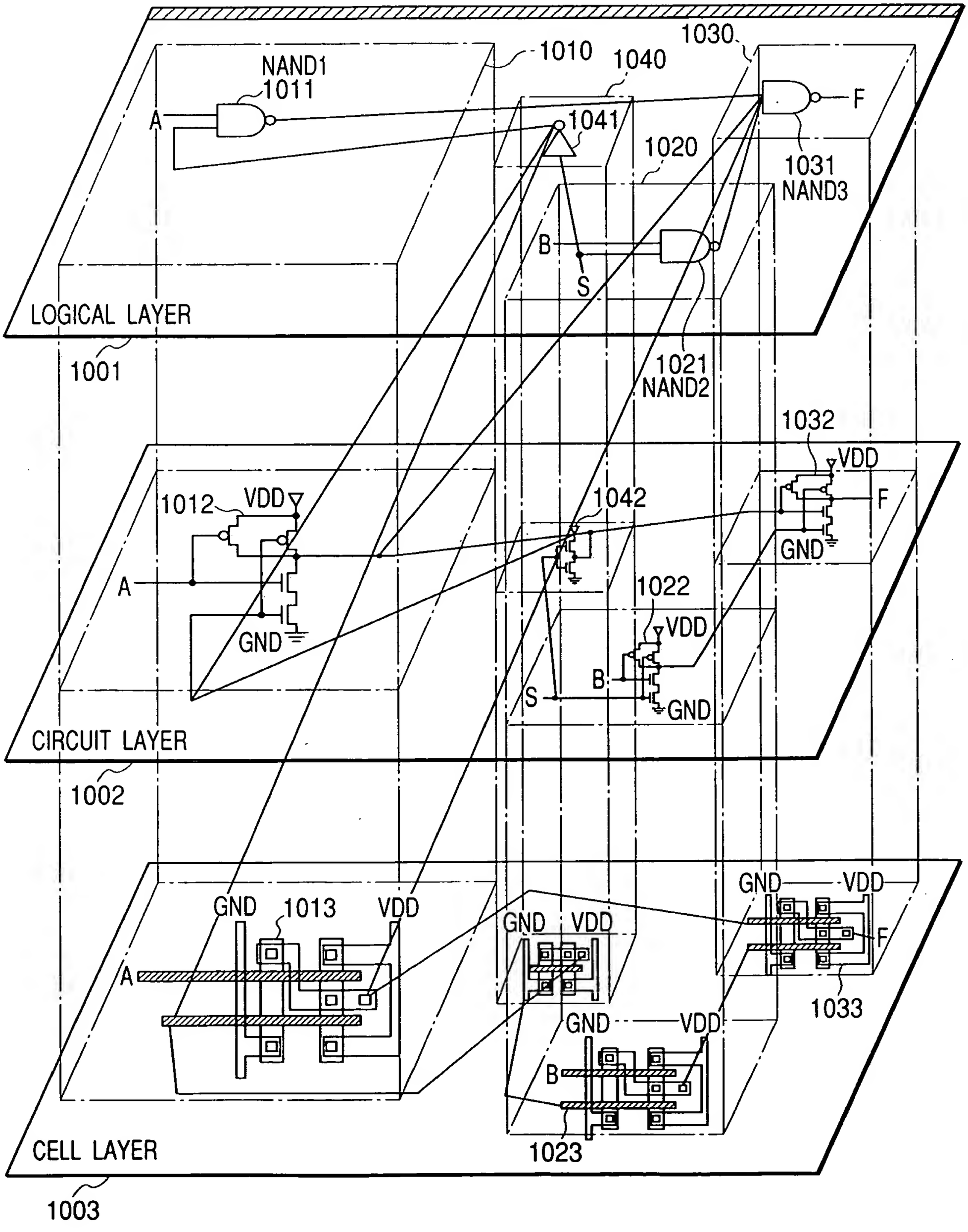

1030
1010
1040
NAND1
1011
A
1041
F
1020
1031
NAND3
B
S
LOGICAL LAYER
1001
1021
NAND2
1032
VDD
1012
VDD
1042
F
A
GND
GND
1022
VDD
B
S
GND
CIRCUIT LAYER
1002
GND
1013
VDD
GND
VDD
GND
VDD
F
A
1033
GND
VDD
B
1023
CELL LAYER
1003

FIG. 28

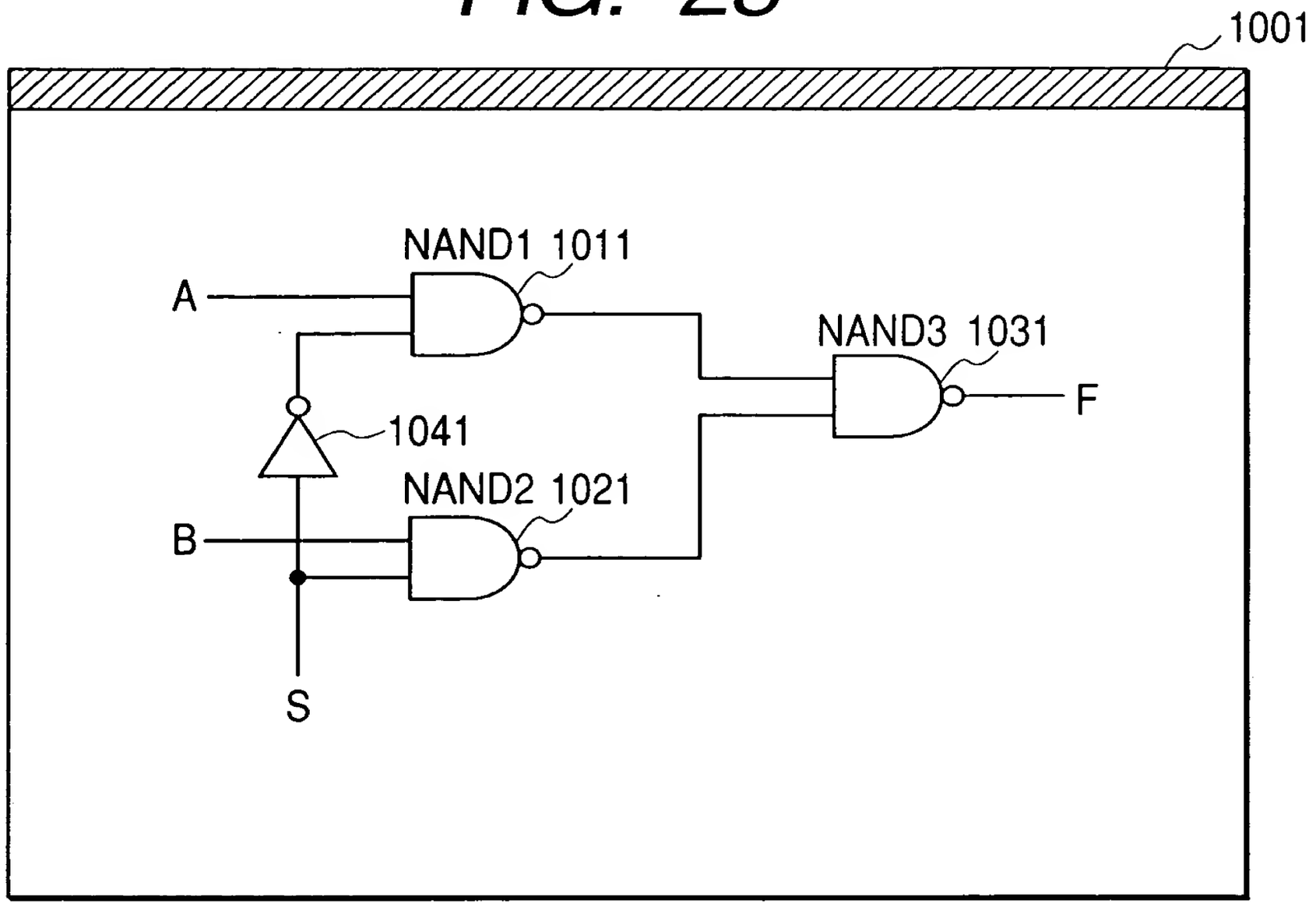
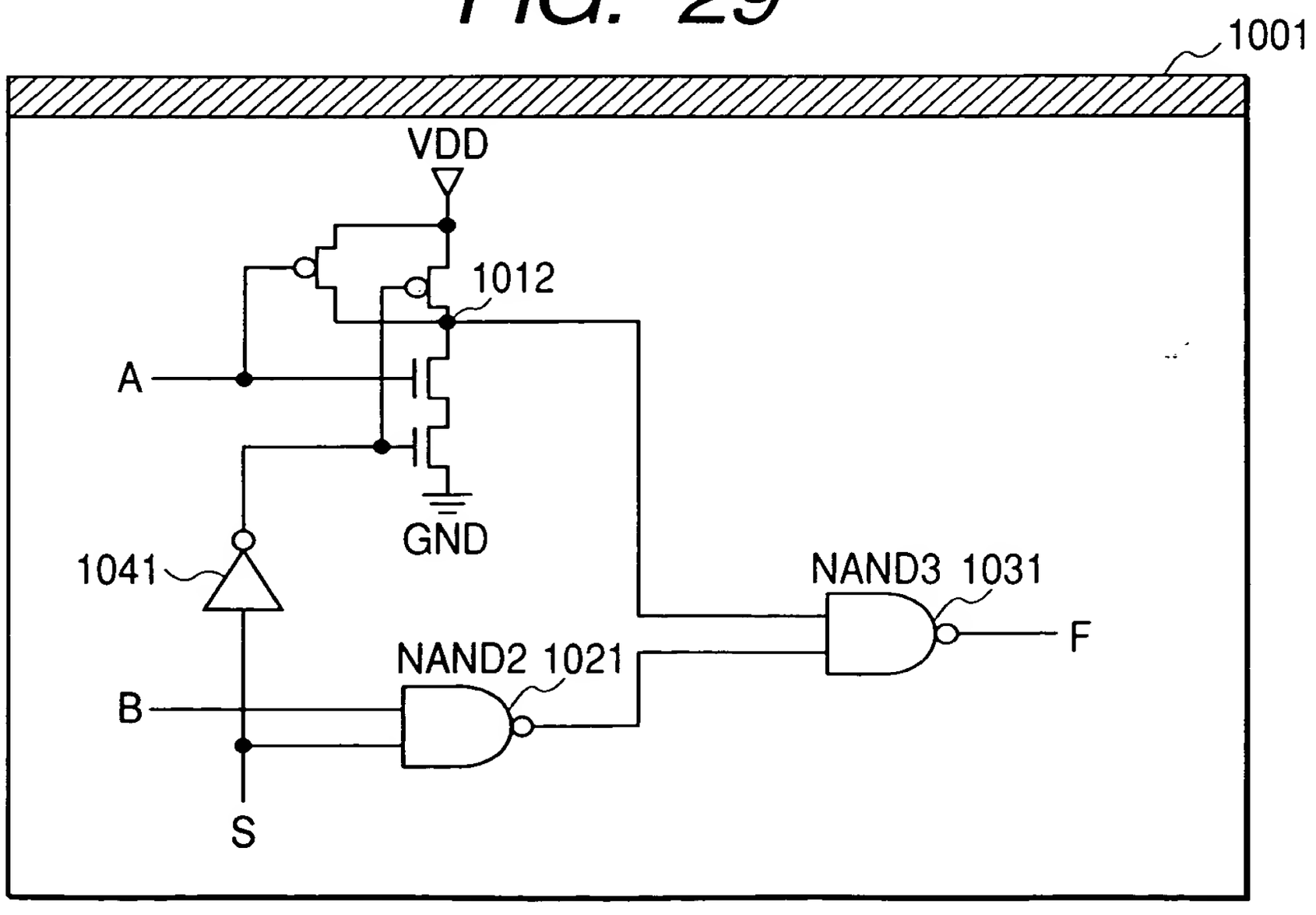


FIG. 29



Docket # 0040-0

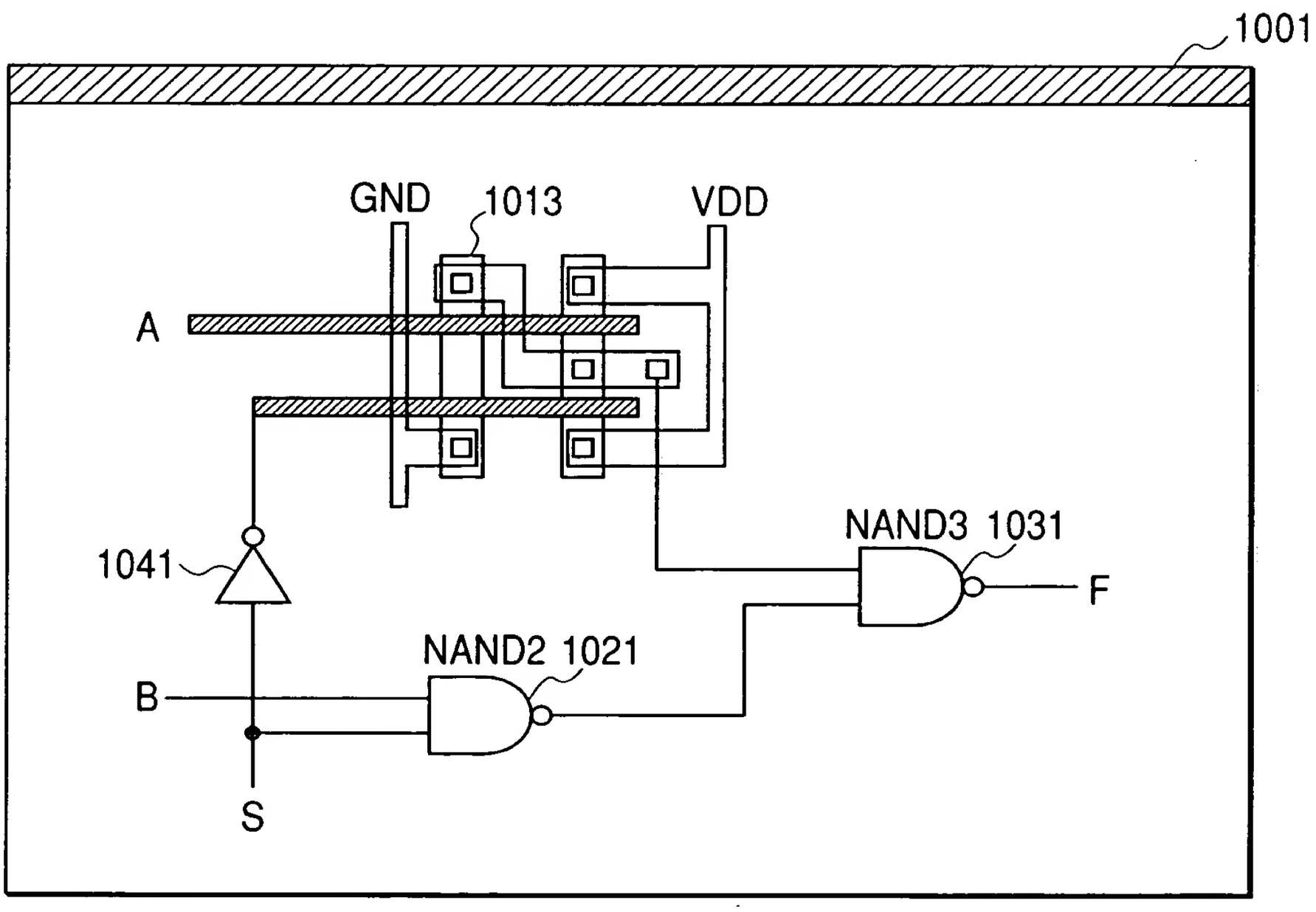



FIG. 30